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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/769,385	01/30/2004	Tienteh Chen	200312792-1	8388

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EXAMINER

TSOY, ELENA

ART UNIT	PAPER NUMBER
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1762

DATE MAILED: 09/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/769,385

Applicant(s)

CHEN ET AL.

Examiner

Elena Tsoy

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 August 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) 23-37 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on August 25, 2006 has been entered.

Request for Reconsideration

Request for Reconsideration filed on August 25, 2006 has been entered. Claims 1-37 are pending in the application. Claims 23-37 are withdrawn from consideration as directed to a non-elected invention.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirose et al (US 6,203,899) in view of Santo et al (US 5,965,252), Abe et al (US 5,372,884) and Alexander et al (US 3,007,878).

Hirose et al disclose a method of preparing an ink-jet media sheet (See column 3, lines 4-13), comprising preparing a porous coating composition (See column 4, lines 60-63) comprising cationic ultrafine particles having a positive charge on their surfaces and adsorbability of acid

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substances such as oxides of magnesium, calcium, aluminum, zinc, chromium, iron, copper, tin, lead and manganese or particles having a negative charge on their surfaces like silica surface-treated to change the negative charge on the surface to a positive charge (See column 3, lines 62-67; column 4, lines 1-3); and coating the porous coating composition on a media substrate (See column 4, lines 40-43). Among the ultrafine particles of the metal oxides, particularly preferable examples include ultrafine particles of alumina, and alumina hydrate such as gibbsite, bayerite, nordstrandite, crystalline boehmite, diaspor and pseudoboehmite (See column 4, lines 3-15). Hirose et al also disclose a method of treating particles having a negative charge on their surfaces like colloidal *silica* to change the negative charge on the surface to a positive charge to form cationized silica (See column 3, lines 62-67; column 4, lines 1-3) for the use in an ink-jet media sheet (See column 3, lines 4-13). The cationized silica is formed by treating colloidal silica with a compound containing some of *cationic* metal oxides or metal atoms such as alumina and alumina hydrate such as gibbsite, bayerite, nordstrandite, crystalline boehmite, diaspor and pseudoboehmite (claimed surface activating agent) (See column 3, lines 62-67; column 4, lines 3-15) or by treating silica with an organic compound having both amino group or quaternary ammonium group thereof and functional group having reactivity to a silanol group on the surface of silica, such as aminoethoxysilane (claimed organosilane reagent) (See column 4, lines 19-26) by dispersing silica in water and contacting it with the silane (See column 15, lines 23-28).

Hirose et al fail to teach that: (i) colloidal silica particles are treated first with alumina or alumina hydrate so that a negative charge on its surface changes to a positive charge forming cationized silica then the cationized silica having on its surface alumina or alumina hydrate is contacted with the organosilane reagent to form organosilane modified cationized silica; (ii)

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colloidal silica particles are treated with the cationic alumina and alumina hydrate by dispersing silica particles in an aqueous environment to form an aqueous dispersion (Claim 1).

As to (i), Santo et al teach that an alumina hydrate surface-treated in an aqueous dispersion (See column 7, lines 52-56) with a silane coupling agent (See column 3, lines 39-44) such as gamma-aminopropyltriethoxysilane (See column 5, line 2) when used in an ink-receiving layer composition provides image formed on the ink-receiving layer with no change in tint and good color reproducibility (See column 2, lines 56-67). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have surface treated silica particles in Hirose et al first with alumina hydrate in an aqueous dispersion so that silica has on its surface alumina hydrate then subjecting the surface treated silica in the aqueous dispersion to a treatment with an organosilane reagent such as aminoethoxysilane with the expectation of providing image formed on an ink-receiving layer with no change in tint and good color reproducibility, as taught by Santo et al.

As to (ii), Abe et al teach that a cation-modification of colloidal silica for the use in an ink receiving layer (See column 2, lines 28-34) by coating with a hydrous metal oxide such as hydrous aluminum oxide, hydrous zirconium oxide, hydrous tin oxide or the like can be carried out by the method described in US 3,007,878 to Alexander et al (See column 2, lines 41-58). Alexander et al teach that the method comprises mixing a 30% aquasol of colloidal silica (See column 7, lines 56-57) with an aqueous solution of a basic salt of a polyvalent metal such as 1 M/L (See column 7, lines 63-66) basic aluminum chloride (See column 4, lines 9-10) to coat the silica particles with an oxygen compound of the polyvalent metal and thereby forming a stable aquasol of positively charged coated silica particles (See Fig. 2; column 1, lines 58-63; column 2, lines 1-40; column 4, lines 1-19). It would have been obvious to one of ordinary skill in the art at the time the invention

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was made to have carried out coating of colloidal silica with alumina or alumina hydrate in Hirose et al by contacting colloidal silica in an aqueous dispersion with a basic salt of a polyvalent metal such as aluminum in an aqueous solution with the expectation of providing the desired cation-modification, as taught by Abe et al and Alexander et al.

As to claims 2-4, it is held that a proper sequence of adding ingredients to obtain the most satisfactory mixture is within a skill of a person of ordinary skill in the art, and such a choice does not involve invention.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have mixed colloidal silica and a metal salt solution in Hirose et al in view of Abe et al and Alexander et al in any order including claimed sequence and portion-wise addition with the expectation of providing the desired cation-modification of silica since it is held that a proper sequence of adding ingredients to obtain the most satisfactory mixture is within a skill of a person of ordinary skill in the art, and such a choice does not involve invention.

As to claims 5, 9, 16, and 18, It is held that concentration limitations are obvious absent a showing of criticality. Akzo v. E.I. du Pont de Nemours 1 USPQ 2d 1704 (Fed. Cir. 1987).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have determined the optimum values of the relevant concentration parameters (including those of claimed invention) in Hirose et al in view of Abe et al and Alexander et al through routine experimentation in the absence of showing of criticality.

As to claim 6, it is well known in the art to use high shear mixer in obtaining thoroughly mixed dispersion.

As to claims 11 and 20, It is the Examiner's position that alumina or alumina hydrate is adsorbed on the surface of silica because it is treated by a process substantially identical to that of claimed invention.

As to claim 14, Alexander et al teach that the positive charge density and degree of metal oxygen compound coating of the silica particles are important factors in establishing stability of the resulting sol (See column 6, lines 17-20), which factors depend on concentration of a metal compound and pH of the system (See column 6, lines 20-38). In other words, pH of the system has to be maintained at a predetermined level, i.e. should be monitored.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have monitored pH of a system in Hirose et al in view of Abe et al and Alexander et al and maintained at a predetermined level with the expectation of providing the desired positive charge density and degree of metal oxygen compound coating on the silica particles since Alexander et al teach that the positive charge density and degree of metal oxygen compound coating on the silica particles are important factors in establishing stability of the resulting sol, which factors depend on concentration of a metal compound and pH of the system.

Response to Arguments

3. Applicants' arguments filed August 25, 2006 have been fully considered but they are not persuasive.

(A) Applicants argue that a prima facie case of obviousness with respect to pending claims has not been met. Specifically, the references do not provide sufficient teachings or motivation to be modified or combined in order to arrive at Applicant's invention; and the combination of references is based on hindsight. Hirose teaches the treatment of silica with metal

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oxide or organic groups for use in a printing medium. Hirose does not teach a sequence of steps that includes cationizing the silica and modifying the cationized silica with an organosilane reagent as required by independent claims 1 and 15. Abe also teaches the use of cation-modified silica in ink-jet sheets by specifically referring to Alexander for the method of cationizing the silica. Alexander was filed in 1956 and outlines a basic reaction scheme for cationizing silica in an aqueous solution. However, neither Abe nor Alexander teaches the steps of cationizing silica and also modifying the cationized silica with an organosilane reagent as required by the present invention. Further, Santo uses aluminum hydrate dispersion instead of a silica dispersion as required by the present method. None of the references cited by the Examiner teach the steps of cationizing the surface of the silica and modifying the silica with an organosilane reagent.

The Examiner disagrees. Hirose teaches that silica for the use in an **ink receiving layer** (See column 3, lines 4-13) can be **cationized** by treating silica with a compound containing some of the cationic metal oxides or metal atoms such as alumina and alumina hydrate such as gibbsite, bayerite, nordstrandite, crystalline boehmite, diaspore and pseudoboehmite (claimed surface activating agent) (See column 3, lines 62-67; column 4, lines 3-15) or by treating silica with an organic compound having both amino group or quaternary ammonium group thereof and functional group having reactivity to a silanol group on the surface of silica, such as aminoethoxysilane (See column 4, lines 19-26) by dispersing silica in water and contacting it with the silane (See column 15, lines 23-28). Abe et al teach that a **cation-modification** of colloidal silica for the use in an **ink receiving layer** (See column 2, lines 28-34) by coating with a hydrous metal oxide such as hydrous aluminum oxide, hydrous zirconium oxide, hydrous tin oxide or the like can be carried out by the method described in US 3,007,878 to Alexander et al (See

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column 2, lines 41-58), e.g. by mixing aquasol of colloidal silica (**dispersion of silica in water**) with an aqueous solution of basic aluminum chloride (See Alexander et al, column 4, lines 9-10; column 7, lines 56-57). One of ordinary skill in the art would have *motivation and reasonable expectation of success* to cationize silica with cationic alumina or alumina hydrate in Hirose by mixing aquasol of colloidal silica with an aqueous solution of basic aluminum chloride. Clearly, **mixing** can be done by adding the aqueous solution of basic aluminum chloride to the **dispersion of silica in water**, which dispersion is made by **claimed step of dispersing silica in water**.

Hirose et al in view of Abe et al and Alexander et al fail to teach that silica particles are first coated with alumina or alumina hydrate and then with the organic compound.

Santo et al teach that an alumina hydrate surface-treated in an aqueous dispersion (See column 7, lines 52-56) with a silane coupling agent (See column 3, lines 39-44) such as gamma-aminopropyltriethoxysilane (See column 5, line 2) when used in an ink-receiving layer composition provides image formed on the ink-receiving layer with no change in tint and good color reproducibility (See column 2, lines 56-67). One of ordinary skill in the art would have *motivation and reasonable expectation of success* to have treated a coated silica in Hirose et al in view of Abe et al and Alexander et al with an organosilane reagent with the expectation of providing image formed on an ink-receiving layer with no change in tint and good color reproducibility since the coated silica in Hirose et al in view of Abe et al has and Alexander et al has the same alumina hydrate surface as in Santo et al, and Santo et al teach that surface-treatment of alumina hydrate in an aqueous dispersion with a silane coupling agent such as gamma-aminopropyltriethoxysilane when used in an ink-receiving layer composition provides image formed on **the ink-receiving layer** with no change in tint and good color reproducibility.

Therefore, the references cited by the Examiner teach the steps of cationizing the surface of the silica and modifying the silica with an organosilane reagent, and a prima facie case of obviousness with respect to pending claims has been met.

(B) Applicants argue that the Examiner alleges that an ordinary person skilled in the art would be motivated to make recited combination and would have a likelihood of success since the coated silica of Hirose in view of Abe and Alexander "has the same alumina hydrate surface as in Santo." See Office Action page 5. However, a close inspection of the cited references reveals that the chemical surface structure is quite different. Alexander provides a figure of the surface of its activated silica. The figure clearly shows a silica particle having an outer silicon atom surface partially bound by a basic aluminum chloride compound having the formula, $\text{Al}_3\text{O}_2(\text{OH})_2^+\text{Cl}^-$. See Figures 1 and 2. Likewise, one would expect a similar composition for Abe and Hirose, since both references teach a similar surface-activated silica particle. It is worthy to note, that the entire surface of the silica particle need not be bound. Alexander discloses "a surface coverage of about 2.4 mol percent." See col. 4, lines 54-55. The present invention requires a surface activating agent in a sufficient amount to modify the net charge of the surface from positive to negative. See page 7, lines 31-32 and page 8, lines 1-2.

The Examiner disagrees. First of all, primary reference of Hirose requires a surface activating agent in a sufficient amount to modify the net charge of the surface from positive to negative just like claimed invention. Secondly, Abe et al also form cation-modified silica, i.e. Abe also requires a surface activating agent in a sufficient amount to modify the net charge of the surface from positive. Moreover, Abe and Alexander are *secondary* references which are relied upon to show *how* to treat silica with alumina hydrate.

Conclusion

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elena Tsoy whose telephone number is 571-272-1429. The examiner can normally be reached on Monday-Thursday, 9:00AM - 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on 571-272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Elena Tsoy
Primary Examiner
Art Unit 1762

**ELENA TSOY
PRIMARY EXAMINER**



September 20, 2006